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COMMENTS:

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The Chemical Company

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December 1, 2011



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Via Federal Express

United States Environmental Protection Agency - East
Attn: TSCA Section 8(e)
Room 6428
1201 Constitution Avenue, NW
Washington, DC 20004

Subject: Notice in Accordance with Section 8(e): Report Results of Acute Toxicity Tests with Magnasol 4620 G

Dear Section 8(e) Coordinator:

BASF Corporation is submitting report results of Acute Toxicity Tests with Magnasol 4620 G, (IUPAC Name: Dialuminium chloride pentahydroxide and 1,2-Ethanediamine, polymer with (chloromethyl)oxirane and N-methylmethanamine), (Mixture of CAS No. 12042-91-0 and 42751-79-1 in water) conducted by Bay Harbor Laboratories.

BASF Corporation understands that reporting of the results from this study under TSCA 8(e) is in accordance with EPA's policy. However, the study was not conducted with the knowledge or guidance of BASF, and technical issues may have contributed to the apparent toxicity. BASF does not feel that these results accurately depict the toxicity of the substance in the environment.

If you have any questions, please contact the undersigned at (973) 245-6693.

Sincerely,

Janet Cerra

Janet Cerra
Product Regulatory Center of Expertise
North America

/



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CONTAINS NO CBI



November 4, 2011

**Great
Lakes
Environmental
Center**

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Mr. Rick Howard
CMS Land Company
2936 Charlevoix Avenue
Petoskey, MI 49770

**RE: *Ceriodaphnia dubia* and *Pimephales promelas* Acute-LC₅₀ and
Chronic-NOEC, LOEC and IC₂₅ Determinations for CMS Land
Company's Product: Magnisol 4620 G**

Dear Mr. Howard:

Great Lakes Environmental Center (GLEC), Inc. has completed our LC₅₀ (median lethal) determination from the results of a 48-hour *Ceriodaphnia dubia* and a 96-hour *Pimephales promelas* (fathead minnow) static acute toxicity test and the NOEC (No-Observed-Effect-Concentration), LOEC (Lowest-Observed-Effect-Concentration), and IC₂₅ (25% Inhibition Concentration) determinations from the *C. dubia* and fathead minnow short-term chronic toxicity tests performed with CMS Land Company's product Magnisol 4620 G (GLC Number: 9063).

CMS Land Company supplied the Magnisol 4620 G product for the toxicity evaluations. An initial toxicity range-finding test was conducted to determine the test concentrations to be used for the 48-hour *C. dubia* and 96-hour fathead minnow definitive acute toxicity tests. Based on the results of the toxicity range-finding tests, GLEC initiated the definitive acute toxicity tests with *C. dubia* and fathead minnows with a 0.6 serial dilution factor at the six test concentrations listed in Table 1. In turn, the definitive short-term chronic toxicity tests were initiated based on the results of the definitive acute toxicity tests, with a dilution factor of 0.5 at the test concentrations listed in Table 1. All test concentrations reported are gravimetric test concentrations (they were prepared by diluting a known weight (grams) of the test material rather than quantified using analytical methods).

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Table 1. Toxicity Range-finding and Definitive Acute and Short-Term Chronic Toxicity Test Concentrations for CMS Land Company Sample Study Product: Magnisol 4620G

Product GLC#	Organism	Toxicity Range-Finding Nominal Concentrations (mg/L)	Definitive Acute Toxicity Test Nominal Concentrations (mg/L)	Definitive Short-Term Chronic Toxicity Test Nominal Concentrations (mg/L)
Magnisol 4620G	<i>C. dubia</i>	1, 10, 100, 1,000, and 10,000	0.05, 0.08, 0.13, 0.22, 0.36, and 0.60	0.03, 0.06, 0.13, 0.25, 0.50, and 1.00
GLC# 9063	Fathead Minnow	1, 10, 100, 1,000, and 10,000	0.80, 1.30, 2.20, 3.60, 6.00, and 10.0	0.31, 0.63, 1.25, 2.50, 5.00, and 10.0

Material and Methods

These tests were conducted following the procedures outlined by EPA-821-R-02-012, *Methods for Measuring the Acute Toxicity of Effluents and Receiving Waters to Freshwater Organisms*, Fifth Edition (methods 2000.0 and 2002.0), EPA-821-R-02-013, *Short-term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to Freshwater Organisms*, Fourth Edition (methods 1000.0 and 1002.0), and Great Lakes Environmental Center, Inc. Standard Operating Procedures.

Test Organisms

C. dubia and fathead minnows of the required age were obtained from GLEC's in house cultures and used for test initiation. The age of the *C. dubia* used for the definitive acute toxicity test was less than 24 hours, and the age of *C. dubia* used for the definitive chronic toxicity test was also less than 24 hours old, with each test organism within an 8 hour range window. The fathead minnows for the definitive acute toxicity test were between 24 hours and 14 days old, with each test organism within a 24 hour age range. The fathead minnows used to initiate the definitive chronic toxicity test were less than 24 hours old at test initiation.

Dilution water

The dilution water used for both the *C. dubia* and fathead minnow definitive acute and the fathead minnow short-term chronic toxicity tests was reconstituted moderately hard water with a total hardness of 80-100 mg/L as CaCO₃ and an alkalinity of 60 to 76 mg/L as CaCO₃. Dilute mineral water (DMW; also moderately hard water) was used as dilution water for the short-term chronic *C. dubia* toxicity test.

Sample Preparation Procedures for Toxicity Tests

The test concentrations for the definitive acute toxicity and the definitive short-term chronic toxicity tests were made from a single stock solution. The stock solutions used for the *C. dubia* and fathead minnow toxicity tests were prepared by diluting a known weight (grams) of test product to a known volume with dilution water (moderately hard dilution water or DMW). The stock solutions were prepared in volumetric flasks and allowed to mix on a stir plate for 30 minutes. All toxicity test concentrations were made from the stock solution using appropriate graduated cylinders and calibrated analytical pipets.

Test Concentrations

The Magnisol 4620 G stock solution concentration for the *C. dubia* and fathead minnow definitive acute toxicity tests were; 1.0 mg/L and 10.0 mg/L, respectively. The stock solution for the definitive short-term chronic toxicity tests were made daily; 1.0 mg/L for the *C. dubia* and 10.0 mg/L for the fathead minnow. Both the *C. dubia* and fathead minnow definitive acute toxicity tests were conducted with six test concentrations using a dilution factor of 0.6 and a dilution water control. The definitive short-term chronic toxicity test for *C. dubia* was conducted with six test concentrations and the fathead minnow toxicity test was conducted with five, both short-term chronic toxicity tests used a 0.5 dilution factor. These test concentrations are summarized in Table 1.

Toxicity Test Monitoring

For the definitive acute *C. dubia* and fathead minnow toxicity tests, temperature, dissolved oxygen, and pH were monitored prior to test initiation, at 24 hours, and at test termination in each test concentration and control. Conductivity was measured at the initiation and termination of both tests in all test concentrations. *C. dubia* and fathead minnow survival was recorded daily.

For the definitive short-term chronic *C. dubia* and fathead minnow toxicity tests, temperature, dissolved oxygen, and pH were measured in the pre- and post-renewal solutions of all test concentrations and controls. Conductivity was measured daily in each of the new (pre- renewal) solutions for all test concentrations and controls.

C. dubia survival and neonate production was recorded daily for the chronic toxicity test. *C. dubia* tests were terminated when 60 percent or more of the surviving female *C. dubia* controls had produced three broods and averaged at least 15 neonates per female.

Fathead minnow survival was recorded daily and growth was measured as average dry weight at test termination.

Data Analysis

The effects measured during the *C. dubia* 48-hour and fathead minnow 96-hour definitive acute toxicity tests included survival over the exposure period. The statistical analysis performed followed the methods outlined in the EPA-821-R-02-012, *Methods for Measuring the Acute Toxicity of Effluents and Receiving Waters to Freshwater Organisms*, Fifth Edition. The LC₅₀ values were calculated using Trimmed Spearman-Karber method (Montana State University, 1978) and Probit (EPA Probit version 1.5).

The statistical analysis of the definitive short-term chronic *C. dubia* survival and reproduction, and the fathead minnow survival and growth toxicity tests were performed using the program TOXCALC, (version 5.0.32) and followed the guidelines outlined in *Short-term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to Freshwater Organisms*, Fourth Edition. All survival, reproduction, and growth endpoints were used to calculate NOEC, LOEC, and IC₂₅ estimates.

For the chronic toxicity tests, all percent survival data were transformed using an arc sine-square root transformation. *C. dubia* reproduction and fathead minnow growth data were not arc sine-square root transformed prior to analysis. All transformed and untransformed data were tested for normality and homogeneity of variances using the Shapiro-Wilks Test or Kolmogorov D Test and Bartlett's test, respectively. An analysis of variance (ANOVA) was conducted with each data set using the most appropriate parametric (e.g., Dunnet's or Bonferroni tests) or nonparametric (e.g., Steel's Many-One Rank or Wilcoxon with Bonferroni's) statistical model. If the data failed to meet the assumptions of normality or homogeneity, then a nonparametric test was used to analyze the data. In addition, the reproduction and growth data were analyzed using linear interpolation, a point estimate endpoint, to calculate an IC₂₅ value.

Results

Definitive Acute Toxicity

The 48-hour definitive acute toxicity test LC₅₀ estimate for *C. dubia* exposed to Magnisol 4620 G was 0.32 mg/L. A summary of the test conditions for the *C. dubia* toxicity test are included in Table 2. The 48-hour *C. dubia* LC₅₀ estimate and toxicity test results are summarized in Table 3.

The 96-hour definitive acute toxicity range-finding LC₅₀ estimate for fathead minnows exposed to Magnisol 4620 G was 2.87 mg/L. A summary of the test conditions for the fathead minnow toxicity test are included in Table 4. The 96-hour fathead minnow LC₅₀ estimate and toxicity test results are summarized in Table 5.

Mr. Rick Howard
CMS Land Company

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November 4, 2011

Definitive Short-Term Chronic

The definitive short-term chronic NOEC and LOEC for *C. dubia* survival was 0.50 mg/L and 1.0 mg/L of Magnisol 4620 G, respectively. The NOEC and LOEC for *C. dubia* reproduction were 0.13 and 0.25 mg/L, respectively. In addition, the IC₂₅ estimate for *C. dubia* reproduction was 0.33 mg/L of Magnisol 4620 G. A summary of the test conditions for the *C. dubia* toxicity test are included in Table 6. The *C. dubia* toxicity test results; LC₅₀, NOEC, LOEC and IC₂₅ estimates for survival and reproduction are summarized in Table 7.

The fathead minnow definitive short-term chronic NOEC and LOEC for survival were 2.50 mg/L and 5.00 mg/L of Magnisol 4620 G, respectively. The NOEC and LOEC for fathead minnow growth were 2.50 mg/L and 5.00 mg/L, respectively. In addition, the IC₂₅ estimate for the fathead minnows exposed to Magnisol 4620 G was 3.13 mg/L. A summary of the test conditions for the fathead minnow toxicity test are included in Table 8. The fathead minnow toxicity test results; LC₅₀, NOEC, LOEC and IC₂₅ estimates for fathead minnow survival and growth are summarized in Table 9.

Copies of the raw laboratory data are included in Appendix A and standard reference toxicant data are included in Appendix B.

If you have any questions or comments concerning the results of these toxicity tests, please contact either me or Dennis McCauley at (231) 941-2230. Thank you for the opportunity to provide this service to CMS Land Company. We look forward to working with you again in the future.

Sincerely,

Mailee W. Garton

Mailee W. Garton
Laboratory Coordinator

MWG:mg

Enclosures.

TABLE 2
Toxicity Acute Toxicity Test Conditions
CMS-Bay Harbor
Magnisol 4620 G (GLC Number: 9063)
Ceriodaphnia dubia

Summary of Toxicity Test Conditions	
1. Test Species and Age:	<i>Ceriodaphnia dubia</i> , <24 hours old
2. Test Type and Duration:	Static, 48 hours
3. Test Dates:	September 19-21, 2011
4. Test Temperature (°C):	25 ± 1
5. Light Quality:	Ambient Laboratory, 50-100 FC (Foot Candle)
6. Photoperiod:	16 h light, 8 h darkness
7. Feeding Regime:	None
8. Size of Test Vessel:	30 mL solo cups
9. Volume and Depth of Test Solutions:	25 mL
10. No. of Test Organisms per Test Vessel:	5
11. No. of Test Vessels per Test Solution:	4
12. Total No. of Test Organisms per Test Solution:	20
13. Test Concentrations (mg/L):	0.60, 0.36, 0.22, 0.13, 0.08, and 0.05
14. Renewal of Test Solutions:	None
15. Dilution and Primary Control Water:	Moderately Hard Synthetic Laboratory (Mod Hard Reconstituted # 1920)
16. Test Material:	Magnisol 4620 G (GLC Number: 9063)
17. Secondary Control Water:	Culture Water: BD# 621
18. Aeration:	None
19. Endpoints Measured:	Mortality (LC ₅₀)

TABLE 3
Acute Toxicity Test Results
CMS-Bay Harbor
Magnisol 4620 G (GLC Number: 9063)
LC₅₀ Determination
Ceriodaphnia dubia

Results of a <i>Ceriodaphnia dubia</i> (genus) (species)		48-Hour Static Acute Toxicity Test							
Conducted <u>09/19/11</u> - <u>09/21/11</u> (mm/dd/yy) (mm/dd/yy)		Using: Magnisol 4620 G (GLC Number: 9063)							
Test Solutions	Cumulative Percent Mortality (Cumulative Percent Affected) ^a				LC ₅₀ Values (mg/L) (EC ₅₀)				
	24-Hr	48-Hr	72-Hr	96-Hr	24-Hr	48-Hr	72-Hr	96-Hr	
Primary Control/ Dilution Water	0 (0)	0 (0)	N/A	N/A	>0.60 (>0.60)	0.32 (0.32)	NA	NA	
0.05 mg/L	0 (0)	0 (0)	N/A	N/A	48-Hour LC ₅₀ and EC ₅₀ = 0.32 mg/L				
0.08 g/L	0 (0)	0 (0)	N/A	N/A	LC ₅₀ 95% Confidence Limits (EC ₅₀ 95% Confidence Limits)				
0.13 mg/L	0 (0)	20 (20)	N/A	N/A	24-Hr	48-Hr	72-Hr	96-Hr	
0.22 mg/L	0 (0)	35 (35)	N/A	N/A	LL NR	0.26	NA	NA	
0.36 mg/L	0 (0)	50 (50)	N/A	N/A	UL NR	0.42	NA	NA	
0.60 mg/L	20 (20)	80 (80)	N/A	N/A	LL (NR)	(0.26)			
					UL (NR)	(0.42)			
					LL = Lower Limit UL = Upper Limit NR = Confidence Intervals are not reliable				
					Method(s) Used to Determine LC ₅₀ and EC ₅₀ Confidence Limit Values: Probit				

* Cumulative percent affected is the total percentage of test organisms observed dead, immobile, exhibiting loss of equilibrium or other defined endpoints.

TABLE 4
Acute Toxicity Test Conditions
CMS-Bay Harbor
Magnisol 4620 G (GLC Number: 9063)
Pimephales promelas

Summary of Toxicity Test Conditions	
1. Test Species, Age, Length, and Weight:	<i>Pimephales promelas</i> (fathead minnow), 7 days old
2. Test Type and Duration:	Static
3. Test Dates:	September 15-19, 2011
4. Test Temperature (°C):	25 ± 1
5. Light Quality:	Ambient Laboratory, 50-100 FC (Foot Candle)
6. Photoperiod:	16 h light, 8 h darkness
7. Feeding Regime:	<i>Artemia nauplii</i>
8. Size of Test Vessel:	250 mL beaker
9. Volume and Depth of Test Solutions:	200 mL
10. No. of Test Organisms per Test Vessel:	10
11. No. of Test Vessels per Test Solution:	2
12. Total No. of Test Organisms per Test Solution:	20
13. Test Concentrations (mg/L):	10.0, 6.00, 3.60, 2.20, 1.30, and 0.80
14. Renewal of Test Solutions:	None
15. Dilution and Primary Control Water:	Moderately Hard Synthetic Laboratory (Mod Hard Reconstituted # 1919)
16. Test Material:	Magnisol 4620 G (GLC Number: 9063)
17. Secondary Control Water:	None
20. Aeration:	None
21. Endpoints Measured:	Mortality (LC ₅₀)

TABLE 5
Acute Toxicity Test Results
CMS-Bay Harbor
Magnisol 4620 G (GLC Number: 9063)
LC₅₀ Determination
Pimephales promelas

Results of a <i>Pimephales promelas</i> (genus) (species)				96-Hour Static Acute Toxicity Test				
Conducted <u>09/15/11</u> - <u>09/19/11</u> (mm/dd/yy) (mm/dd/yy)		Using: Magnisol 4620 G (GLC Number: 9063)						
Test Solutions	Cumulative Percent Mortality (Cumulative Percent Affected) ^a				LC ₅₀ Values (mg/L) (EC ₅₀)			
	24-Hr	48-Hr	72-Hr	96-Hr	24-Hr	48-Hr	72-Hr	96-Hr
Primary Control/ Dilution Water	0 (0)	0 (0)	0 (0)	0 (0)	3.67 (3.67)	3.36 (3.36)	3.14 (2.93)	2.87 (2.87)
0.80 mg/L	0 (0)	0 (0)	5 (5)	5 (5)	96-Hour LC ₅₀ = 2.87 mg/L			
1.30 mg/L	0 (0)	0 (0)	0 (0)	0 (0)	LC ₅₀ 95% Confidence Limits (EC ₅₀ 95% Confidence Limits)			
2.20 mg/L	0 (0)	0 (0)	0 (0)	5 (5)	24-Hr	48-Hr	72-Hr	96-Hr
3.60 mg/L	75 (75)	80 (80)	85 (85)	90 (90)	LL 3.13	2.93	2.81	2.63
6.00 mg/L	70 (70)	90 (90)	90 (100)	100 (100)	UL 4.31	3.86	3.50	3.14
10.0 mg/L	95 (95)	100 (100)	100 (100)	100 (100)	LL (3.13)	(2.93)	2.73	(2.63)
					UL (4.31)	(3.86)	(3.14)	(3.14)
					LL = Lower Limit UL = Upper Limit NR = Confidence Intervals are not reliable			
					Method(s) Used to Determine LC ₅₀ and EC ₅₀ Confidence Limit Values: Trimmed Spearman Karber and Probit			

^a Cumulative percent affected is the total percentage of test organisms observed dead, immobile, exhibiting loss of equilibrium or other defined endpoints.

TABLE 6
Chronic Toxicity Test Conditions
CMS-Bay Harbor
Magnisol 4620 G (GLC Number: 9063)
Ceriodaphnia dubia

Summary of Toxicity Test Conditions	
1. Test Species and Age:	<i>Ceriodaphnia dubia</i> , < 24 hours old (8 hours)
2. Test Type and Duration:	7-Day Static-Renewal, 8 days
3. Test Dates:	September 22-30, 2011
4. Test Temperature (°C):	25 ± 1
5. Light Quality:	Ambient Laboratory, 50-100 FC (Foot Candle)
6. Photoperiod:	16 h light, 8 h darkness
7. Feeding Regime:	Daily: <i>Pseudokirchneriella subcapitata</i> and YTC at renewal
8. Size of Test Vessel:	30 mL beaker
9. Volume Test Solutions:	15 mL
10. No. of Test Organisms per Test Vessel:	1
11. No. of Test Vessels per Test Solution:	10
12. Total No. of Test Organisms per Test Solution:	10
13. Test Concentrations (mg/L):	1.00, 0.50, 0.25, 0.13, 0.06, and 0.03
14. Renewal of Test Solutions:	Daily
15. Dilution and Primary Control Water:	Moderately Hard Synthetic Laboratory (Dilute Mineral Water: DMW # 1868-1870)
16. Test Material:	Magnisol 4620 G (GLC Number: 9063)
17. Secondary Control Water:	Culture Water: BD # 621
18. Aeration:	None
19. Endpoints Measured:	Survival (NOEC) and Reproduction (NOEC, IC ₂₅)

TABLE 7
Chronic Toxicity Test Results
CMS-Bay Harbor
Magnisol 4620 G (GLC Number: 9063)
LC₅₀, NOEC, LOEC for Survival and IC₂₅, NOEC, LOEC for Reproduction
Ceriodaphnia dubia

Results of a <i>Ceriodaphnia dubia</i> (genus) (species)		7-Day Static Renewal Chronic Toxicity Test					
Conducted	09/22/11 - 09/30/11 (mm/dd/yy)	Using: Magnisol 4620 G (GLC Number: 9063)					
Test Concentrations	Primary Control/ Dilution Water	0.03 mg/L	0.06 mg/L	0.13 mg/L	0.25 mg/L	0.50 mg/L	1.00 mg/L
48-hour Survival (%)	100	100	100	100	100	80	60
8-day Mean Survival (%)	100	100	100	100	100	70	60*
8-day Mean Reproduction/Female	21.4	18.8	18.2	17.5*	17.1*	14.0*	10.4*
48-Hour LC ₅₀ *	>1.0 mg/L						
8-Day Mean Survival (%) NOEC	0.50 mg/L						
8-Day Mean Survival (%) LOEC	1.00 mg/L						
8-Day Mean Reproduction per Female - NOEC	0.13 mg/L						
8-Day Mean Reproduction per Female - LOEC	0.25 mg/L						
8-Day Mean Reproduction per Female - IC ₂₅	0.33 mg/L						

*: Significantly different ($p < 0.05$) from the dilution water control

LC₅₀: Median Lethal Toxicant Concentration

NOEC: No Observed Effect Concentration

LOEC: Lowest Observed Effect Concentration

IC₂₅: 25% Inhibition Concentration

TABLE 8
Chronic Toxicity Test Conditions
CMS-Bay Harbor
Magnisol 4620 G (GLC Number: 9063)
Pimephales promelas

Summary of Toxicity Test Conditions	
1. Test Species and Age:	<i>Pimephales promelas</i> , < 24 hours old
2. Test Type and Duration:	7-Day Static-Renewal
3. Test Dates:	September 20-27, 2011
4. Test Temperature (°C):	25 ± 1
5. Light Quality:	Ambient Laboratory, 50-100 FC (Foot Candle)
6. Photoperiod:	16 h light, 8 h darkness
7. Feeding Regime:	Daily: Newly Hatched <i>Artemia</i> nauplii fed beginning of work day prior to renewal and at the end of work day, after renewal
8. Size of Test Vessel:	500 mL beaker
9. Volume Test Solutions:	250 mL
10. No. of Test Organisms per Test Vessel:	10
11. No. of Test Vessels per Test Solution:	4
12. Total No. of Test Organisms per Test Solution:	40
13. Test Concentrations (mg/L):	10.0, 5.00, 2.50, 1.25, 0.63, and 0.31
14. Renewal of Test Solutions:	Daily
15. Dilution and Primary Control Water:	Moderately Hard Synthetic Laboratory (Mod Hard Reconstituted # 1920-1922)
16. Test Material:	Magnisol 4620 G (GLC Number: 9063)
17. Secondary Control Water:	None
18. Aeration:	None
19. Endpoints Measured:	Survival (NOEC) and Growth (NOEC, IC ₂₅)

TABLE 9
Chronic Toxicity Test Results
CMS-Bay Harbor
Magnisol 4620 G (GLC Number: 9063)
LC₅₀, NOEC, LOEC for Survival and IC₂₅, NOEC, LOEC for Growth
Pimephales promelas

Results of a <i>Pimephales promelas</i> (genus) (species)		<u>7-Day Static Renewal Chronic Toxicity Test</u>				
Conducted	09/20/11 - 09/27/11 (mm/dd/yy)	Using: <u>Magnisol 4620 G (GLC Number: 9063)</u>				
Test Concentrations	Primary Control/ Dilution Water	0.31 mg/L	0.63 mg/L	1.25 mg/L	2.50 mg/L	5.00 mg/L
96-hour Survival (%)	86.9	82.5	87.5	100	92.5	2.50
7-day Mean Survival (%)	84.2	80.0	87.5	87.5	90.0	0*
7-day Mean Biomass (mg)	0.447	0.460	0.492	0.493	0.478	0.0*

96-Hour LC ₅₀ *	3.57 mg/L
7-Day Mean Survival (%) NOEC	2.50 mg/L
7-Day Mean Survival (%) LOEC	5.00 mg/L
7-Day Mean Biomass (mg) - NOEC	2.50 mg/L
7-Day Mean Biomass (mg) - LOEC	5.00 mg/L
7-Day Mean Biomass (mg)- IC ₂₅	3.13 mg/L

*: Significantly different ($p < 0.05$) from the dilution water control

LC₅₀: Median Lethal Toxicant Concentration

NOEC: No Observed Effect Concentration

LOEC: Lowest Observed Effect Concentration

IC₂₅: 25% Inhibition Concentration

Appendix A

Raw Data Sheets



Great Lakes Environmental Center



DAPHNID 48-HOUR STATIC ACUTE TOXICITY TEST

TEST MATERIAL: Bay Harbor - Magdalisc
PROJECT NUMBER: 2112-00

TEST SPECIES: *C. dubia*
TYPE OF TEST: Regulatory

INCUBATOR NUMBER: 9 SHELF NUMBER: 2
NUMBER OF DAPHNIDS/CHAMBER: 5
NUMBER OF CHAMBERS: 4 + 1 for chemicals
AGE / SOURCE OF DAPHNIDS: <24hs; In house: M 9/17/11

PH: 19.0 DILUTION WATER: 0.0 mg/L 2^o C ONTROL: SD# 021

GLC AND/OR BATCH NUMBER: 9063

TEST TEMPERATURE: 25±1°C
LIGHT INTENSITY (H-c): 19.6 PHOTO PERIOD: 16:8

DATE	TEST DAY	TECH. INITIALS	TREATMENT LEVEL	M1 (Control)				A 0.05 mg/L				B 0.08 mg/L				C 0.13 mg/L				D 0.23 mg/L				E 0.36 mg/L					
				1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4		
9/19/11	0	MLV	TEMPERATURE (°C)	25.0	24.9	25.0	25.0	25.2	25.2	25.3	25.3	25.2	25.2	25.3	25.3	25.2	25.2	25.3	25.3	25.2	25.2	25.3	25.3	25.2	25.3	25.4	25.3	25.4	
9/19/11	0	MLV	pH	7.85	7.95	7.93	7.91	7.91	7.93	7.91	7.91	7.91	7.91	7.91	7.91	7.91	7.91	7.91	7.91	7.91	7.91	7.91	7.91	7.91	7.91	7.91	7.91	7.91	
9/19/11	0	MLV	DO (mg/L)	7.9	6.0	8.0	7.9	7.9	7.9	7.9	7.9	7.9	7.9	7.9	7.9	7.9	7.9	7.9	7.9	7.9	7.9	7.9	7.9	7.9	7.9	7.9	7.9	7.9	7.9
9/19/11	0	MLV	SP. CONDUCTANCE (µmhos/cm)	329	333	326	326	326	326	326	326	326	326	326	326	326	326	326	326	326	326	326	326	326	326	326	326	326	326
OBSERVATIONS																													
1				TEMPERATURE (°C)				24.0				24.1				24.1				24.2				24.1					
9/20/11				pH				7.99				8.05				8.04				8.02				8.07					
9/20/11				DO (mg/L)				8.1				8.4				8.2				8.1				8.1					
OBSERVATIONS																													
2				TEMPERATURE (°C)				25.4				25.4				25.4				25.3				25.1					
9/21/11				pH				8.11				8.28				8.21				8.17				8.16					
9/21/11				DO (mg/L)				7.4				7.7				7.6				7.5				7.4					
OBSERVATIONS																													
9/22/11				SP. CONDUCTANCE (µmhos/cm)				342				332				336				333				335					

Observation Key:

DOB = Dried Out on Beaker

ERR = Erratic Swimming

IMM = Immobile

TE = Technician Error

P = Pale

PM = Particulate Matter

FS = Film on Surface

F = Floater

D = Died

REVIEWED BY: DJM Maine WaterDATE: 9/28/11

Revised 2/1/2011



DAPHNID 48-HOUR STATIC ACUTE TOXICITY TEST

TEST MATERIAL: Baug Harbor - Algalised
 PROJECT NUMBER: 2113-00

TEST SPECIES: C. dubia
 TYPE OF TEST: Regulatory

INCUBATOR NUMBER: 9 SHELF NUMBER: 2
 NUMBER OF DAPHNIDS/CHAMBER: 5
 NUMBER OF CHAMBERS: 4 + 1 for chemicals
 AGE / SOURCE OF DAPHNIDS: <24hrs; In house: 9d 9/13/11

DILUTION WATER: 1920 2^o CONTROL: BD# 621
 GLC AND/OR BATCH NUMBER: 9063
 TEST TEMPERATURE: 25±1°C
 LIGHT INTENSITY (ft-c): 19.6 PHOTOPERIOD: 16:8

DATE	TEST DAY	TECH. INITIALS	TREATMENT LEVEL	2 ^o BD Control				1				2				3				
				REPLICATE NUMBER	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
9/19/11	0	MLV		TEMPERATURE (°C)	25.3															
				pH	8.14															
				DO (mg/L)	9.4															
				SP. CONDUCTANCE	310															
				NUMBER LIVE	5	S	S	S												
				OBSERVATIONS																
				TEMPERATURE (°C)	24.0															
				pH	8.38															
				DO (mg/L)	8.3															
				NUMBER LIVE	5	S	S	S												
				OBSERVATIONS																
				TEMPERATURE (°C)	24.9															
				pH	8.47															
				DO (mg/L)	7.6															
				SP. CONDUCTANCE	323															

Observation Key:

DOB = Dried Out on Beaker

PM = Particulate Matter

FS = Film on Surface

IMM = Immobile

TE = Technician Error

P = Pale

REVIEWED BY: J. Maiorino, Jr.

DATE: 9/18/11

EPA PROBIT ANALYSIS PROGRAM
USED FOR CALCULATING LC/EC VALUES
Version 1.5

bay harbor magnisol cdubia acute sept 19 2011

Conc.	Number Exposed	Number Resp.	Observed	Proportion
			Proportion Responding	Adjusted for Controls
0.0500	20	0	0.0000	0.0000
0.0800	20	0	0.0000	0.0000
0.1300	20	4	0.2000	0.2000
0.2200	20	7	0.3500	0.3500
0.3600	20	10	0.5000	0.5000
0.6000	20	16	0.8000	0.8000

Chi - Square for Heterogeneity (calculated) = 2.466
 Chi - Square for Heterogeneity
 (tabular value at 0.05 level) = 9.488

bay harbor magnisol cdubia acute sept 19 2011

Estimated LC/EC Values and Confidence Limits

Point	Exposure	95% Confidence Limits	
	Conc.	Lower	Upper
LC/EC 1.00	0.053	0.023	0.082
LC/EC 50.00	0.318	0.255	0.420

FISH 96-HOUR STATIC ACUTE TOXICITY TEST

TEST MATERIAL: Bay Haulor - Magnisoi 44206
 PROJECT NUMBER: 212-00
 GC# 91063
 TEST SPECIES: FHM AGE/SOURCE OF FRY: In House: 16|| = 1650
 SHELF NUMBER: 9
 INCUBATOR NUMBER: 9119
 DILUTION WATER: Mod Hard # 10
 NO. FRY/CHAMBER: 10

TEST MATERIAL: Bay Haulor - Magnisoi 44206
 PROJECT NUMBER: 212-00
 GC# 91063
 TEST SPECIES: FHM AGE/SOURCE OF FRY: In House: 16|| = 1650
 SHELF NUMBER: 9
 INCUBATOR NUMBER: 9119
 DILUTION WATER: Mod Hard # 10
 NO. FRY/CHAMBER: 10

PHOTOPERIOD (L:D): 16:8
 LIGHT INTENSITY (ft-c): Ambient Day 0/50 Day 4/
 TEST TEMPERATURE (°C): 25 ± 1°C

DATE TIME	TEST DAY	TECH. INITIALS	TREATMENT LEVEL	MH (Con)	A (0.8 mg/L)	B (3 mg/L)	C (2.2 mg/L)	D (3.6 mg/L)	E (6.0 mg/L)	F (10 mg/L)
				REPLICATE NUMBER	1	2	1	2	1	2
9/15/11 15:10	10 0	AD	Number Live	25.0	25.1	25.2	25.3	25.3	25.5	25.7
				Temperature (°C)	7.90	7.94	7.95	7.95	7.93	7.90
				pH	8.1	8.1	8.1	8.1	8.1	8.1
				DO (mg/L)	3.24	3.21	3.21	3.21	3.22	3.22
9/16/11 16:00	1 1	MLV	Number Live	10	10	10	10	10	10	10
				Observations						
				Temperature (°C)	14.8	14.7	14.7	14.7	14.8	14.8
				pH	7.68	7.60	7.63	7.63	7.68	7.69
9/17/11 0948	2	MLV	Number Live	6.6	6.5	7.0	7.1	7.1	7.1	7.2
				Observations						
				Temperature (°C)	25.1	25.2	25.2	25.2	25.2	25.6
				pH	7.79	7.86	7.86	7.85	7.85	7.89
9/18/11 0939	3	MLV	Number Live	90 (mg/L)	7.1	7.3	7.3	7.3	7.6	7.6
				Observations						
				Temperature (°C)	25.0	25.1	25.0	25.0	25.1	25.5
				pH	7.86	7.91	7.93	7.98	8.05	8.07
9/19/11 15:19	4	MLV	Number Live	DO (mg/L)	7.3	7.1	7.2	7.3	7.5	7.5
				Observations						
				Temperature (°C)	24.8	24.7	24.7	24.7	24.7	24.7
				pH	7.94	7.98	7.97	7.97	8.06	8.06
9/19/11 15:19	4	MLV	Number Live	DO (mg/L)	7.7	7.6	7.4	7.2	7.6	7.6
				Observations						
				Temperature (°C)	24.8	24.7	24.7	24.7	24.7	24.7
				pH	7.94	7.98	7.97	7.97	8.06	8.06

Observation Key:
 N - Normal
 ER - Erratic Swimming
 TE - Technician Error

PM - Particulate Matter
 FS - Film on Surface
 P - Pale

Reviewed by: 2011 (Initials w/ date) 9/28/11
 Date: 9/28/11

TRIMMED SPEARMAN-KARBER METHOD. MONTANA STATE UNIV

FOR REFERENCE, CITE:

HAMILTON, M.A., R.C. RUSSO, AND R.V. THURSTON, 1977.
TRIMMED SPEARMAN-KARBER METHOD FOR ESTIMATING MEDIAN
LETHAL CONCENTRATIONS IN TOXICITY BIOASSAYS.
ENVIRON. SCI. TECHNOL. 11(7): 714-719;
CORRECTION 12(4):417 (1978).

DATE: 9/15/201
CHEMICAL: MAGNISOL 4620g

TEST NUMBER: 2112
SPECIES: FHM

RAW DATA:

CONCENTRATION(MG/l)	.80	1.30	2.20	3.60	6.00	10.00
NUMBER EXPOSED:	20	20	20	20	20	20

DURATION (HOURS)	LC50	LOWER 95% LIMIT	UPPER 95% LIMIT	PERCENT
TRIM				
5.00	24	3.67	3.13	4.31
1.67	72	3.14	2.81	3.50
1.67	72-ec50	2.93	2.73	3.14
2.50	96	2.87	2.63	3.14

EPA PROBIT ANALYSIS PROGRAM
USED FOR CALCULATING LC/EC VALUES
Version 1.5

bay harbor magnisol fhm 48 hr lc50 sept 2011

Conc.	Number Exposed	Number Resp.	Observed	Proportion
			Proportion Responding	Adjusted for Controls
0.8000	20	0	0.0000	0.0000
1.3000	20	0	0.0000	0.0000
2.2000	20	0	0.0000	0.0000
3.6000	20	16	0.8000	0.8000
6.0000	20	18	0.9000	0.9000
10.0000	20	20	1.0000	1.0000

Chi - Square for Heterogeneity (calculated) = 9.146
 Chi - Square for Heterogeneity
 (tabular value at 0.05 level) = 9.488

bay harbor magnisol fhm 48 hr lc50 sept 2011

Estimated LC/EC Values and Confidence Limits

Point	Exposure Conc.	95% Confidence Limits	
		Lower	Upper
LC/EC 1.00	1.651	1.037	2.066
LC/EC 50.00	3.358	2.927	3.858



DAPHNID 7-DAY STATIC RENEWAL CHRONIC TOXICITY TEST

TEST MATERIAL: Bay Harbor TYPE OF TEST: Daphnid Chronic Test

PROJECT NUMBER: 2112-00 INCUBATOR NUMBER: #5 SHELF NUMBER: #9

TEST SPECIES: C. dubia LIGHT INTENSITY (ft-c): DAY OF 71.4 DAY OF 50 x EXPT =

YOUNG SOURCE #: In house; BD or DMWV Y / 16 / 2011

YOUNG SOURCE #: Within 8 hours DATE / TIME: 0 9/22/11 1 9/23/11 2 9/24/11 3 9/25/11 4 9/26/11 5 9/27/11 6 9/28/11 7 9/29/11 8 9/30/11

TECH INITIALS: 0 1615 AD 1 1430 2 1435 3 DS 8:35 4 AD 1615 5 AD 1530 6 1530 AM 7 1530 AM 8 1330 25

TEST MATERIAL: Magnesium Chloride TYPE OF TEST: Daphnid Chronic Test

PROJECT NUMBER: 2112-00 INCUBATOR NUMBER: #5 SHELF NUMBER: #9

TEST SPECIES: C. dubia LIGHT INTENSITY (ft-c): DAY OF 71.4 DAY OF 50 x EXPT =

YOUNG SOURCE #: In house; BD or DMWV Y / 16 / 2011

YOUNG SOURCE #: Within 8 hours DATE / TIME: 0 9/22/11 1 9/23/11 2 9/24/11 3 9/25/11 4 9/26/11 5 9/27/11 6 9/28/11 7 9/29/11 8 9/30/11

TECH INITIALS: 0 1615 AD 1 1430 2 1435 3 DS 8:35 4 AD 1615 5 AD 1530 6 1530 AM 7 1530 AM 8 1330 25

TEST CHAMBER NUMBER

CONCENTRATIONS	DAY	TEST CHAMBER NUMBER										DISSOLVED OXYGEN*	TEMPERATURE*	SC*			
		1	2	3	4	5	6	7	8	9	10						
CON	0	+	+	+	+	+	+	+	+	+	+	8.19	7.9	202			
	1	+	+	+	+	+	+	+	+	+	+	8.11	8.53	7.5	8.4	25.0	24.1
	2	+	+	+	+	+	+	+	+	+	+	8.19	8.03	8.3	8.4	24.8	24.7
	3	+	+	+	+	+	+	+	+	+	+	8.32	8.52	8.0	8.4	25.0	25.0
	4	+	+	+	+	+	+	+	+	+	+	8.10	7.9	7.6	7.6	24.5	24.7
	5	+	+	+	+	+	+	+	+	+	+	8.16	8.35	8.0	8.0	24.8	24.3
	6	+	+	+	+	+	+	+	+	+	+	8.08	8.44	7.3	8.0	24.1	24.5
	7	+	+	+	+	+	+	+	+	+	+	8.19	8.34	8.5	8.5	24.8	24.5
	8	+	+	+	+	+	+	+	+	+	+	8.37	8.4	—	8.4	—	—
A	0	+	+	+	+	+	+	+	+	+	+	8.21	7.7	24.0	24.0	200	—
	1	+	+	+	+	+	+	+	+	+	+	8.16	8.56	7.6	8.3	25.2	24.1
	2	+	+	+	+	+	+	+	+	+	+	8.36	8.45	7.3	8.4	24.8	24.1
	3	+	+	+	+	+	+	+	+	+	+	8.34	8.55	8.0	8.5	25.0	25.0
	4	+	+	+	+	+	+	+	+	+	+	7.91	8.48	7.7	8.6	24.3	24.7
	5	+	+	+	+	+	+	+	+	+	+	8.17	8.38	7.9	8.1	24.9	24.6
	6	+	+	+	+	+	+	+	+	+	+	8.12	8.55	7.4	8.5	24.2	24.5
	7	+	+	+	+	+	+	+	+	+	+	8.25	8.45	8.6	8.3	24.8	24.3
	8	+	+	+	+	+	+	+	+	+	+	8.42	8.5	—	8.5	—	—

NOTE: * Temperature (°C) measured in all new solutions & two randomly selected old solutions
 pH: SU = pH of solution "SC: Specific Conductance (μmhos/cm)
 a = alive; - = dead; e = eggs present;
 P = Pale; F = Floating; SG = Stuck to bubble
 a = aborted young; - = Split Broad; TE = technician error

Key: + = alive; - = dead; e = eggs present;
 P = Pale; F = Floating; SG = Stuck to bubble
 a = aborted young; - = Split Broad; TE = technician error

Reviewed by: M. Miller 10/31/11
 Date: 10/31/11



DAPHNID 7-DAY STATIC RENEWAL CHRONIC TOXICITY TEST

Page 3 of 4.

Magnified
4x20x
Baylor Harbor
TEST MATERIAL: DATE OF TEST: Dilution Factor: 10³
PROJECT NUMBER: 9 SHELF NUMBER: 5 Regulatory Potency:

INCUBATOR NUMBER: 5 DMW NUMBER: DAY 0 1808 DAY 3/17/89 DAY 6 1875 ALGAE NUMBER: DAY 0 851 DAY — DAY —

TEST SPECIES: C. dubia LIGHT INTENSITY (R-C): DAY 0 71.4 DAY GLC NUMBER: DAY 0 10 mg/l- STUCK dead DAY — DAY —

YOUNG SOURCE: In house; BD or DMW 9 / 16/2011 YOUNG AGE: <24 hours; Within 8 hours DATE / TIME: 0 9/22/11 1 9/23/11 2 9/24/11 3 9/25/11 4 9/26/11 5 9/27/11 6 9/28/11 NO 6

TECH INITIALS: 0 1255 AM 110 1430 2 1400 115 3 01 8:35 4 AD 1455 5 AD 1315 6 14:30 7 1530 8

CONCENTRATIONS	DAY	TEST CHAMBER NUMBER	pH*					DISSOLVED OXYGEN*			TEMPERATURE*			SC*
			NEW	OLD	NEW	OLD	NEW	OLD	NEW	OLD	NEW	OLD	NEW	
0.25 mg/L	0	+	+	+	+	+	+	+	+	+	8.21	7.9	24.1	201
	1	+	+	+	+	+	+	+	+	+	8.15	8.62	8.6	26.3 24.2
	2	+	+	+	+	+	+	+	+	+	8.01	8.40	8.4	24.8 24.7
	3	+	re	re	re	re	re	re	re	re	8.33	8.56	8.5	25.2 24.8
	4	re 4	re 4	re 5	re 5	re 4	re 4	re 3	re 4	re 4	7.90	8.53	8.1	24.3 24.7
	5	re 6	re 7	re 6	re 6	re 5	re 5	re 6	re 6	re 6	8.19	8.44	8.1	24.9 24.6
	6	re 6	re 6	re 4	re 8	re 6	re 6	re 6	re 6	re 6	8.14	8.60	7.7	24.2 24.6
	7	re 6	re 6	re 8	re 8	re 10	re 9	re 6	re 6	re 10	8.15	8.46	8.5	24.9 24.2
0.50 mg/L	8	re 10	re 10	re 10	re 10	re 9	re 9	re 8	re 8	re 12	8.44	8.6	8.6	25.0 —
	0	+	+	+	+	+	+	+	+	+	8.21	7.9	24.2	201
	1	+	+	+	+	+	+	+	+	+	8.13	8.59	7.9	26.3 24.3
	2	+	re	+	+	re	+	+	+	+	8.30	8.43	8.1	24.8 24.7
	3	re	re	re	re	re	re	re	re	re	8.34	8.58	8.5	25.1 24.9
	4	re 4	re 2	re 3	re 3	re 4	re 4	re 3	re 4	re 4	7.16	8.59	8.0	24.4 24.8
	5	re 6	re 7	re 5	+	re 6	re 6	re 6	re 7	re 7	8.16	8.35	8.1	24.6 24.6
	6	re	re	re	re	re	re	re	re	re	8.15	8.61	7.8	24.2 24.6
0.50 mg/L	7	re 9	re 9	re 8	re 8	re 10	re 10	re 8	re 8	re 11	8.25	8.46	8.5	24.6 24.2
	8	re 11	re 11	re 13	re 13	re 10	re 10	re 11	re 11	re 11	8.98	—	8.7	— 25.0 —

NOTE: * Temperature (°C) measured in all new solutions & two randomly selected old solutions
Disolved Oxygen: mg/L pH: SU Specific Conductance (μmho/cm)

Key: + = alive; - = dead; e = eggs present;
P = Pale; F = Floating; SB = Stuck to bubble
a = abnormal young; - = Split Brood; TE = technician error

Reviewed By: John Miller, W.G. Goss
Date: 10/13/11



DAPHNID 7-DAY STATIC RENEWAL CHRONIC TOXICITY TEST

Magnesium

TEST MATERIAL: BaBy Thrasher
TYPE OF TEST: Reproductive
TEST NUMBER: 3113-03

PROJECT NUMBER: 9
INCUBATOR NUMBER: 5
TEST SPECIES: C. dubia

YOUNG SOURCE: In house; BD on DMWY 9/16/2011
YOUNG AGE: <24 hours; Within 8 hours
DATE / TIME: 9/22/11 1 AD 1632

LIGHT INTENSITY (fl-c): DAY or 71.4 DAY
TECH INITIALS: 0165 RD

YOUNG AGE: <24 hours; Within 8 hours
DATE / TIME: 9/23/11 2 AD 1632

LIGHT INTENSITY (fl-c): DAY or 71.4 DAY
TECH INITIALS: 0165 RD

YOUNG AGE: <24 hours; Within 8 hours
DATE / TIME: 9/24/11 3 DS 8:35

LIGHT INTENSITY (fl-c): DAY or 71.4 DAY
TECH INITIALS: 0165 RD

YOUNG AGE: <24 hours; Within 8 hours
DATE / TIME: 9/25/11 4 DS 8:35

LIGHT INTENSITY (fl-c): DAY or 71.4 DAY
TECH INITIALS: 0165 RD

YOUNG AGE: <24 hours; Within 8 hours
DATE / TIME: 9/26/11 5 AD 1635

LIGHT INTENSITY (fl-c): DAY or 71.4 DAY
TECH INITIALS: 0165 RD

YOUNG AGE: <24 hours; Within 8 hours
DATE / TIME: 9/27/11 6 DS 8:35

LIGHT INTENSITY (fl-c): DAY or 71.4 DAY
TECH INITIALS: 0165 RD

YOUNG AGE: <24 hours; Within 8 hours
DATE / TIME: 9/28/11 7 DS 8:35

LIGHT INTENSITY (fl-c): DAY or 71.4 DAY
TECH INITIALS: 0165 RD

YOUNG AGE: <24 hours; Within 8 hours
DATE / TIME: 9/29/11 8 DS 8:35

LIGHT INTENSITY (fl-c): DAY or 71.4 DAY
TECH INITIALS: 0165 RD

YOUNG AGE: <24 hours; Within 8 hours
DATE / TIME: 9/30/11 9 DS 8:35

LIGHT INTENSITY (fl-c): DAY or 71.4 DAY
TECH INITIALS: 0165 RD

YOUNG AGE: <24 hours; Within 8 hours
DATE / TIME: 9/31/11 10 DS 8:35

LIGHT INTENSITY (fl-c): DAY or 71.4 DAY
TECH INITIALS: 0165 RD

YOUNG AGE: <24 hours; Within 8 hours
DATE / TIME: 9/30/11 11 DS 8:35

LIGHT INTENSITY (fl-c): DAY or 71.4 DAY
TECH INITIALS: 0165 RD

YOUNG AGE: <24 hours; Within 8 hours
DATE / TIME: 9/30/11 12 DS 8:35

LIGHT INTENSITY (fl-c): DAY or 71.4 DAY
TECH INITIALS: 0165 RD

YOUNG AGE: <24 hours; Within 8 hours
DATE / TIME: 9/30/11 13 DS 8:35

LIGHT INTENSITY (fl-c): DAY or 71.4 DAY
TECH INITIALS: 0165 RD

PH_W: 7.8 DILUTION WATER: DHW

PHOTOPERIOD (L:D): 16:8 TEST TEMPERATURE: 25±1°C

DMW NUMBER: 1868 DAY: 31/08/11 ALGAE NUMBER: DAY 0859 DAY: 6/08/11

GLC NUMBER: DAY 0903 DAY: 24/08/11 YTC NUMBER: DAY 0104 DAY: 7/09/11

Longer media daily
DAY: 9/06/11 DAY: 9/06/11 DAY: 9/06/11 DAY: 9/06/11

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Longer media daily
DAY: 9/06/11 DAY: 9/06/11 DAY: 9/06/11 DAY: 9/06/11

CONCENTRATION	DAY	TEST CHAMBER NUMBER										pH*	DISSOLVED OXYGEN*	TEMPERATURE*	SC*
		1	2	3	4	5	6	7	8	9	10				
	0	+	+	+	+	+	+	+	+	+	+	8.21	7.8	24.4	201
	1	+	+	+	+	+	+	+	+	+	+	8.14	8.63	7.9	25.3
	2	+	+	+	+	+	+	+	+	+	+	8.19	8.41	8.4	24.8
	3	+	+	+	+	+	+	+	+	+	+	8.33	8.51	8.0	25.1
	4	+	+	+	+	+	+	+	+	+	+	7.88	8.61	8.1	24.4
	5	+	+	+	+	+	+	+	+	+	+	8.15	8.42	8.1	25.0
	6	+	+	+	+	+	+	+	+	+	+	8.13	8.59	7.9	24.7
	7	+	+	+	+	+	+	+	+	+	+	8.24	8.45	8.7	24.2
	8	+	+	+	+	+	+	+	+	+	+	7.77	8.48	8.6	24.9
	9	+	+	+	+	+	+	+	+	+	+	8.31	7.8	24.0	321
	10	+	+	+	+	+	+	+	+	+	+	8.36	8.67	7.6	24.6
	11	+	+	+	+	+	+	+	+	+	+	7.24	8.54	8.0	25.5
	12	+	+	+	+	+	+	+	+	+	+	8.20	8.62	6.4	24.7
	13	+	+	+	+	+	+	+	+	+	+	8.13	8.48	8.0	24.6
	14	+	+	+	+	+	+	+	+	+	+	8.17	8.38	8.2	24.1
	15	+	+	+	+	+	+	+	+	+	+	8.13	8.62	8.0	24.2
	16	+	+	+	+	+	+	+	+	+	+	8.13	8.42	7	24.5
	17	+	+	+	+	+	+	+	+	+	+	8.18	8.48	8.5	24.9
	18	+	+	+	+	+	+	+	+	+	+	8.18	8.58	8.5	24.9
	19	+	+	+	+	+	+	+	+	+	+	8.61	8.61	8.9	24.9

NOTE: * Temperature (°C) measured in all new solutions & two random selected old solutions
P = Pale; F = Floating; SB = Stuck to bubble
a = aborted young; * = Split Brood; TE = technician error

Reviewed By Paula Lefebvre Date 10/31/11

Young Summary

Test Material/Client: Bay Harbor-Mtg n501
 Project Number: 2112-02 46006
 Test Dates: 9/30/11 - 9/30/11
 GLC Numbers: 9003

Tech Initials MAR

QC Initials MLV

Test Replicate	Test Concentrations								
	Primary control	DN	DN	DN	DN	DN	DN	Secondary control	
	15	22	24	18	16	19	19	20	
	20	18	15	15	17	0	0	19	22
	21	23	20	19	16	9	0	0	16
	20	19	15	21	19	14	20	24	
	30	21	20	21	17	22	0	0	23
	27	22	25	24	21	0	0	19	21
	18	15	17	16	17	16	0	0	TE
	19	15	11	21	13	21	15	21	
	23	22	17	15	15	20	0	0	18
	23	14	22	18	20	20	19	12	15
Total Young	111	113	113	115	114	117	114	116	
Number of Adults (not including T.E. or males)	10	10	10	10	10	10	10	10	
Average Young per Adult	11.1	11.3	11.3	11.5	11.4	11.7	11.4	11.6	

O: organism mortality

Ø: no young

T.E.: technician error

a: aborted young

Ceriodaphnia Survival and Reproduction Test-7 Day Survival										
Start Date:	9/22/2011	Test ID:	2112magcd	Sample ID:				magnisol		
End Date:	9/30/2011	Lab ID:	-GREAT LAKES ENVIRONM	Sample Type:				product		
Sample Date:	Protocol: EPAFW02-EPA/821/R-02-01				Test Species:				CD-Ceriodaphnia dubia	
Comments:	Bay Harbor-CMS 2112-00; Septmeber 2011 Magnisol 4620G									

Conc-mg/L	1	2	3	4	5	6	7	8	9	10
DMW Control	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
0.0313	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
0.063	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
0.125	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
0.25	1.0000	0.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
0.5	1.0000	0.0000	0.0000	1.0000	1.0000	0.0000	1.0000	1.0000	1.0000	1.0000
1	1.0000	1.0000	0.0000	1.0000	0.0000	1.0000	0.0000	1.0000	0.0000	1.0000

Conc-mg/L	Mean	N-Mean	Not			Fisher's	1-Tailed
			Resp	Not Resp	Total		
DMW Control	1.0000	1.0000	0	10	10	10	
0.0313	1.0000	1.0000	0	10	10	10	1.0000 0.0500
0.063	1.0000	1.0000	0	10	10	10	1.0000 0.0500
0.125	1.0000	1.0000	0	10	10	10	1.0000 0.0500
0.25	0.9000	0.9000	1	9	10	10	0.5000 0.0500
0.5	0.7000	0.7000	3	7	10	10	0.1053 0.0500
*1	0.6000	0.6000	4	6	10	10	0.0433 0.0500

Hypothesis Test (1-tail, 0.05)	NOEC	LOEC	ChV	TU
Fisher's Exact Test	0.5	1	0.70711	
Treatments vs DMW Control				

Ceriodaphnia Survival and Reproduction Test-Reproduction

Start Date: 9/22/2011 Test ID: 2112magcd Sample ID: MAGNISOL
 End Date: 9/30/2011 Lab ID: -GREAT LAKES ENVIRONM Sample Type: PRODUCT
 Sample Date: Protocol: EPAFW02-EPA/821/R-02-01 Test Species: CD-Ceriodaphnia dubia
 Comments: Bay Harbor-CMS 2112-00; Septmeber 2011 Magnisol 4620G

Conc-mg/L	1	2	3	4	5	6	7	8	9	10
DMW Control	15.000	18.000	21.000	20.000	30.000	27.000	18.000	19.000	23.000	23.000
0.0313	22.000	15.000	23.000	19.000	21.000	22.000	15.000	15.000	22.000	14.000
0.063	24.000	15.000	20.000	15.000	20.000	25.000	17.000	11.000	17.000	18.000
0.125	18.000	0.000	19.000	21.000	21.000	24.000	16.000	21.000	15.000	20.000
0.25	16.000	17.000	16.000	19.000	17.000	21.000	17.000	13.000	15.000	20.000
0.5	19.000	0.000	9.000	14.000	22.000	0.000	16.000	21.000	20.000	19.000
1	19.000	19.000	0.000	20.000	0.000	19.000	0.000	15.000	0.000	12.000

Conc-mg/L	Transform: Untransformed						Rank Sum	1-Tailed Critical	Isotonic	
	Mean	N-Mean	Mean	Min	Max	CV%			Mean	N-Mean
DMW Control	21.400	1.0000	21.400	15.000	30.000	21.037	10		21.400	1.0000
0.0313	18.800	0.8785	18.800	14.000	23.000	19.390	10	90.50	74.00	18.800 0.8785
0.063	18.200	0.8505	18.200	11.000	25.000	23.282	10	85.00	74.00	18.200 0.8505
0.125	17.500	0.8178	17.500	0.000	24.000	38.214	10	91.00	74.00	17.500 0.8178
*0.25	17.100	0.7991	17.100	13.000	21.000	13.907	10	74.00	74.00	17.100 0.7991
0.5	14.000	0.6542	14.000	0.000	22.000	59.285	10	79.00	74.00	14.000 0.6542
*1	10.400	0.4860	10.400	0.000	20.000	88.962	10	70.50	74.00	10.400 0.4860

Auxiliary Tests					Statistic	Critical	Skew	Kurt
Kolmogorov D Test indicates normal distribution (p > 0.05)					0.74472	0.895	-0.8013	0.70828
Bartlett's Test indicates unequal variances (p = 1.41E-03)					21.639	16.8119		
Hypothesis Test (1-tail, 0.05)	NOEC	LOEC	ChV	TU				
Steel's Many-One Rank Test	0.125	0.25	0.17678					
Treatments vs DMW Control								

Linear Interpolation (200 Resamples)

Point	mg/L	SD	95% CL	Skew
IC05*	0.0129	0.0388	0.0069 0.1631	2.8397
IC10*	0.0258	0.0721	0.0138 0.2630	2.5223
IC15	0.0639	0.1093	0.0208 0.3939	1.6066
IC20	0.2438	0.1520	0.0277 0.5731	0.8232
IC25	0.3347			
IC40	0.6611			
IC50	0.9583			

* indicates IC estimate less than the lowest concentration

Ceriodaphnia Survival and Reproduction Test-Reproduction

Start Date: 9/22/2011 Test ID: 2112magcd Sample ID: MAGNISOL
 End Date: 9/30/2011 Lab ID: -GREAT LAKES ENVIRONM Sample Type: PRODUCT
 Sample Date: Protocol: EPAFW02-EPA/821/R-02-01 Test Species: CD-Ceriodaphnia dubia
 Comments: Bay Harbor-CMS 2112-00; Septmeber 2011 Magnisol 4620G

Conc-mg/L	1	2	3	4	5	6	7	8	9	10
DMW Control	15.000	18.000	21.000	20.000	30.000	27.000	18.000	19.000	23.000	23.000
0.0313	22.000	15.000	23.000	19.000	21.000	22.000	15.000	15.000	22.000	14.000
0.063	24.000	15.000	20.000	15.000	20.000	25.000	17.000	11.000	17.000	18.000
0.125	18.000	0.000	19.000	21.000	21.000	24.000	16.000	21.000	15.000	20.000
0.25	16.000	17.000	16.000	19.000	17.000	21.000	17.000	13.000	15.000	20.000
0.5	19.000	0.000	9.000	14.000	22.000	0.000	16.000	21.000	20.000	19.000
1	19.000	19.000	0.000	20.000	0.000	19.000	0.000	15.000	0.000	12.000

Conc-mg/L	Transform: Untransformed						1-Tailed			
	Mean	N-Mean	Mean	Min	Max	CV%	N	t-Stat	Critical	MSD
DMW Control	21.400	1.0000	21.400	15.000	30.000	21.037	10			
0.0313	18.800	0.8785	18.800	14.000	23.000	19.390	10	0.961	2.347	6.353
0.063	18.200	0.8505	18.200	11.000	25.000	23.282	10	1.182	2.347	6.353
0.125	17.500	0.8178	17.500	0.000	24.000	38.214	10	1.441	2.347	6.353
0.25	17.100	0.7991	17.100	13.000	21.000	13.907	10	1.589	2.347	6.353
*0.5	14.000	0.6542	14.000	0.000	22.000	59.285	10	2.734	2.347	6.353
*1	10.400	0.4860	10.400	0.000	20.000	88.962	10	4.064	2.347	6.353

Auxiliary Tests	Statistic	Critical	Skew	Kurt	
Kolmogorov D Test indicates normal distribution ($p > 0.05$)	0.74472	0.895	-0.8013	0.70828	
Bartlett's Test indicates unequal variances ($p = 1.41E-03$)	21.639	16.8119			
Hypothesis Test (1-tail, 0.05)	NOEC	LOEC	ChV	TU	
Dunnett's Test	0.25	0.5	0.35355		6.35252 0.29685 127.49 36.6254 0.00491 6, 63
Treatments vs DMW Control					



FATHEAD MINNOW 7-DAY STATIC-RENEWAL SURVIVAL AND GROWTH TOXICITY TEST

Page 1 of 6

PROJECT NUMBER: 2112-00
 TEST MATERIAL: Baby Harbor - Minnows 4020
 AGE OF FRY/SOURCE: < 24 hours in house
50.7 ± 0.4°
 TREATMENT LEVEL: CON M H
 LIGHT INTENSITY (ft-c): Ambient Day 0/ = 524.3 Day 7/

NUMBER FRY/CHAMBER: 10
 DILUTION WATER: 1920
 PH: 7.4
 TEMPERATURE (°C): 25 ± 1°C
 PHOTOPERIOD (L:D): 16:8
 INCUBATOR NUMBER: 9
 SHELF NUMBER: 1

DATE TIME	TEST DAY	INITIALS	NUMBER DEAD/NUMBER ALIVE				pH (SU)	D.O. (mg/L)	TEMPERATURE °C	SC*	OBSERVATIONS
			REP 1	REP 2	REP 3	REP 4					
9/20/11 1430	0	AD	10	10	10	10	8.0 ¹ 8.3 ² 8.3 ³	8.3	24.3	331	Gills 9.005 irrigil MH-1920
9/21/11 1420	1	AD	0/0	0/0	0/0	0/0	7.97 ¹ 7.97 ² 7.97 ³	7.5	24.3	334	MH 1920
9/22/11 1315	2	AD	0/0	1/8	0/0	0/0	8.13 ¹ 7.80 ² 7.80 ³	8.1	24.0	329	MH 1921
9/23/11 1411	3	EP/AD	2/8	1/7	0/0	0/0	7.96 ¹ 7.64 ² 7.64 ³	8.0	24.5	330	MH 1921
9/24/11 10:32	4	DS	0/8	0/7	0/0	0/0	8.20 ¹ 7.77 ² 7.77 ³	6.8	25.5	24.7	338 MH 1922
9/25/11 10:15	5	DS	0/8	0/1	0/0	0/0	8.13 ¹ 7.81 ² 7.81 ³	7.2	25.0	24.2	337 MH 1922
9/26/11 16:30	6	EP	0/8	0/7	0/0	0/0	8.07 ¹ 7.66 ² 7.66 ³	7.8	24.4	24.7	341 MH 1923
9/27/11 15:00	7	AD	0/8	1/6	0/0	0/0	7.67 ¹ 6.3 ² 6.3 ³		25.0		

Key:
 N = Normal; ESR = Erratic Swimming; I = Immobilized;
 PM = Particulate Matter; P = Pale; SC= CONDUCTANCE (µmhos/cm)
 TE = Technician Error

Reviewed By: Johnnae W. J. Jinkins Date: 10/31/11

Revised: 1/25/2011



FATHEAD MINNOW 7-DAY STATIC-RENEWAL SURVIVAL AND GROWTH TOXICITY TEST

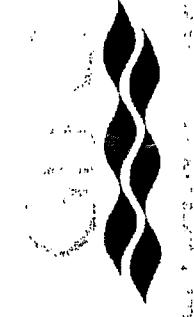
PROJECT NUMBER: 21112.30NUMBER FRY/CHAMBER: 10DILUTION WATER: Mod HardTEMPERATURE (°C): 25±1°C PHOTOPERIOD (L:D): 16:8AGE OF FRY/SOURCE: < 24 hours in HouseINCUBATOR NUMBER: 9 SHELF NUMBER: 1TEST MATERIAL: Bug Harbor Mungus SoilLIGHT INTENSITY (ft-c): Ambient Day 0 / 54.3 Day 71TREATMENT LEVEL: 6A O.31 mg/L10% w/w

DATE TIME	TEST DAY	INITIALS	NUMBER DEAD/NUMBER ALIVE				pH (SU)	D.O. (mg/L)	TEMPERATURE °C	SC	OBSERVATIONS
			REP 1	REP 2	REP 3	REP 4					
9/10/11	0	AN	10	10	10	10	8.08	8.0	24.3	330	
9/11/11	1	AD	0/10	0/10	0/10	0/10	8.07	7.92	7.0	24.3	
9/12/11	2	AD	0/10	1/9	1/8	0/10	8.10	7.65	8.1	6.2	24.7 24.2 333
9/13/11	3	AD	0/10	2/67	0/8	0/9	8.03	7.60	8.1	6.0	24.7 24.3 327
9/14/11	4	DS	0/10	0/1	1/1	0/9	8.22	7.51	8.1	6.0	24.6 328
9/15/11	5	DS	0/10	0/1	0/1	0/9	8.19	7.68	8.0	6.4	25.3 24.7 335
9/16/11	6	DS	0/10	0/1	0/1	0/9	8.08	7.59	7.7	5.4	25.1 24.6 339
9/17/11	7	AN	0/10	0/1	1/6	0/9		7.66	6.0		25.0

Key:
 N = Normal; ER = Erratic Swimming; I = Immobilized;
 PW = Particulate Matter; P = Pale; SC = Conductance (μmhos/cm)
 TE = Technician Error

Reviewed By: Franklin J. Ader Date: 10/3/11

Revised: 1/25/2011



FATHEAD MINNOW 7-DAY STATIC-RENEWAL SURVIVAL AND GROWTH TOXICITY TEST

Page 3 of 6

PROJECT NUMBER: 2113.00
 NUMBER FRY/CHAMBER: 10
 DILUTION WATER: Mod Hard
 TEST MATERIAL: Bay Harbor Manganese 46306
 AGE OF FRY/SOURCE: < 24 hours in house
 TEMPERATURE (°C): 25±1°C PHOTOPERIOD (L:D): 16:8
 TREATMENT LEVEL: 0 B.O.63 mg/L
 LIGHT INTENSITY (ft-c): Ambient Day 0/54.3 Day 7/
 INCUBATOR NUMBER: 9 SHELF NUMBER: 1
 Note: No spin

DATE	TEST DAY	INITIALS	NUMBER DEAD/NUMBER ALIVE				PH (SU)	D.O. (mg/L)	TEMPERATURE °C	SC*	OBSERVATIONS		
			REP 1	REP 2	REP 3	REP 4							
9/20/11	0	AD	10	10	10	10	8.06	8.0	24.3	330			
9/21/11	1	AD	0/10	0/10	0/10	0/10	8.08	7.85	6.9	24.5	24.2	332	
9/22/11	2	AD	1/9	0/9	1/9	0/9	8.09	7.70	8.1	6.3	24.7	24.2	326
9/23/11	3	AD	0/9	1/9	0/9	0/9	8.04	7.63	8.1	6.0	25.3	24.7	327
9/24/11	4	DS	0/9	0/9	1/8	0/9	8.22	7.60	8.1	5.6	25.3	24.8	330
9/25/11	5	DS	0/9	0/9	0/8	0/9	8.19	7.75	8.1	6.7	25.4	24.7	335
9/26/11	6	EP	0/9	0/9	0/8	0/9	8.12	7.61	7.6	5.9	25.0	24.6	339
9/27/11	7	AD	0/9	0/9	0/8	0/9	7.67	6.0		74.8			

Key:
 N = Normal; ER = Erratic Swimming; I = Immobilized;
 PM = Particulate Matter; P = Pale; SC = CONDUCTANCE (μmhos/cm)
 TE = Technician Error

Reviewed by M. Miller Date: 10/3/11

Revised: 1/25/2011

FATHEAD MINNOW 7-DAY STATIC-RENEWAL SURVIVAL AND GROWTH TOXICITY TEST



PROJECT NUMBER: 2113-00 NUMBER FRY/CHAMBER: 10
 TEST MATERIAL: Bug Harbor Mysid 46305 AGE OF FRY/SOURCE: < 24 hours in house
 TREATMENT LEVEL: C 1.25 mg/l LIGHT INTENSITY (ft-c): Ambient Day 0/54.1 Day 7/1
1 INCUBATOR NUMBER: 9 SHELF NUMBER: 1

DATE TIME	TEST DAY	INITIALS	NUMBER DEAD/NUMBER ALIVE				pH (SU)	D.O. (mg/L)	TEMPERATURE °C	SC*	OBSERVATIONS	
			REP 1	REP 2	REP 3	REP 4						
9/20/11	0	AD	10	10	10	10	8.05	7.9	24.3	329		
9/21/11	1	AD	0/10	0/10	0/10	0/10	8.11	7.90	7.7	6.9	24.5	24.2
9/22/11	2	AD	0/10	0/10	0/10	0/10	8.12	7.67	8.1	6.0	24.1	332
9/23/11	3	AD	0/10	0/10	0/10	0/10	8.03	7.58	8.1	5.8	25.2	24.8
9/24/11	4	DS	0/10	0/10	0/10	0/10	8.20	7.64	8.0	6.6	25.2	337
9/25/11	5	DS	0/10	0/10	0/10	0/10	8.19	7.79	8.1	6.8	25.4	330
9/26/11	6	DB	1/10	0/10	1/10	1/10	8.17	7.56	7.7	5.6	25.1	335
9/27/11	7	AB	0/9 ^{TE}	0/10	0/9	0/10	7.69	7.69	6.2	6.2	24.7	339

Key:
 N = Normal; ER = Erratic Swimming; I = Immobilized;
 PM = Particulate Matter; P = Pale; SC = Conductance (µmhos/cm)
 TE = Technician Error

Reviewed by: Franklin J. W. Date: 10/3/11
 Revised: 1/25/2011



FATHEAD MINNOW 7-DAY STATIC-RENEWAL SURVIVAL AND GROWTH TOXICITY TEST

PROJECT NUMBER: 2112.00
 TEST MATERIAL: Buoy Turba Migrusol 4600 AGE OF FRY/SOURCE: < 24 hours in house
 TREATMENT LEVEL: D 2.5 mg/L LIGHT INTENSITY (ft-c): Ambient Day 0/54.3 Day 71

NUMBER FRY/CHAMBER: 10 DILUTION WATER: Mod Hard
 TEMPERATURE (°C): 25±1°C PHOTOPERIOD (L:D): 16:8
 INCUBATOR NUMBER: 9 SHELF NUMBER: 6

DATE TIME	TEST DAY	INITIALS	NUMBER DEAD/NUMBER ALIVE				PH (SU)	D.O. (mg/L)	TEMPERATURE °C	SC*	OBSERVATIONS	
			REP 1	REP 2	REP 3	REP 4						
9/20/11	0	AD	10	10	10	10	8.04	7.9	24.3	329		
9/21/11	1	AD	0/10	0/10	1/10 ^{1/2hr}	8.10 ^{1/2hr}	7.97	7.8	24.6	24.3	332	
9/22/11	2	AD	0/10	0/10	0/10	0/10	8.11	7.72	8.1	6.2	24.7	326
9/23/11	3	AN	0/10 ^{1/2hr}	0/10 ^{1/2hr}	0/10 ^{1/2hr}	0/10 ^{1/2hr}	8.02	7.62	8.1	6.0	25.3	25.2 337
9/24/11	4	DS	0/10	0/10	0/10	0/10	8.17	7.66	8.1	6.2	25.2	25.1 330
9/25/11	5	DS	0/10	0/10	0/10	0/10	8.17	7.83	8.1	7.1	25.5	24.7 335
9/26/11	6	ED	0/10	0/10	0/10	0/10	8.10 ^{1/2hr}	7.57 ^{1/2hr}	7.8	5.6	25.1	25.0 339
9/27/11	7	AD	0/10	0/10	0/10	0/10	7.73 ^{1/2hr}	7.73 ^{1/2hr}	6.6	6.6	24.7	

Key:
 N = Normal; ESR = Erratic Swimming; I = Immobilized;
 PM = Particulate Matter; P = Pale; SC = CONDUCTANCE (μmhos/cm)
 TE = Technician Error

Reviewed by: Henderson Johnson Date: 10/3/11
 Revised: 11/25/2011



FATHEAD MINNOW 7-DAY STATIC-RENEWAL SURVIVAL AND GROWTH TOXICITY TEST

PROJECT NUMBER: 213-00

PROJECT NUMBER:	Baby Harbor Magnets	TEST MATERIAL:	4620	AGE OF FRY/SOURCE:	< 24 hours in house
TREATMENT LEVEL:	E	LIGHT INTENSITY (ft-c):	Ambient Day 0 / S4.3	Day 7/	1
CENTRIFUGE CHAMBER:	1.0	TEMPERATURE (°C):	25± 1°C	PHOTO PERIOD (L:D):	16:8
DILUTION WATER:	Mud Hard	INCUBATOR NUMBER:	9	SHELF NUMBER:	1

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Key:
N = Normal; **ERR** = Erratic Swimming; **I** = Immobilized;
PM = Particulate Matter; **P** = Pale; **SC** = CONDUCTANCE (mmhos/cm)
TE = Technician Error

Revised: 1/25/2011

Reviewed By: Maileen U. Alvarado Date: 10/31/14



Great Lakes Environmental Center

CHRONIC TOXICITY TEST - WEIGHT DATA

TEST MATERIAL: Bay HarborTEST NUMBER: 2112-00TECHNITIAN'S INITIALS: TBQC INITIALS: DSWEIGHT DATE: 9/29/11TEST DATE: 9/20/11 - 9/27/11DRYING DURATION (HOURS): 24TYPE/MODEL OF DRYING OVEN: Blue MOVEN TEMPERATURE (°C): 60TEST SPECIES: FHM

Treatment Level	Rep.	A Weight of Pan and Fry (g)	B Weight of Oven-Dried Pans (g)	A-B Total Dry Fry Weight (g)	C Number of Fry Weight	A-B/C Average Dry Fry Weight (mg)	Biomass weight (mg)
Con (MH)	1	0.81356	0.80940	0.00416	8	0.52000	0.41600
	2	0.81389	0.81044	0.00345	6	0.51500	0.38333
	3	0.81240	0.80708	0.00532	10	0.53200	0.53200
	4	0.81650	0.81194	0.00456	9	0.50667	0.45600
A (6.25%) 0.31mg/L	1	0.81850	0.81299	0.00551	10	0.55100	0.55100
	2	0.81045	0.80598	0.00447	7	0.63857	0.44700
	3	0.81399	0.81042	0.00357	6	0.59500	0.35700
	4	0.82458	0.81974	0.00484	9	0.53778	0.48400
B (12.5%) 0.63mg/L	1	0.81331	0.80845	0.00486	9	0.54000	0.48600
	2	0.81130	0.80593	0.00537	9	0.59667	0.53700
	3	0.81433	0.80984	0.00449	8	0.56125	0.44900
	4	0.82126	0.81632	0.00494	9	0.54889	0.49400
C (25%) 1.25mg/L	1	0.80429	0.79901	0.00528	9	0.58667	0.52800
	2	0.81230	0.80681	0.00549	10	0.54900	0.54900
	3	0.81870	0.81359	0.00511	9	0.56778	0.51100
	4	0.80908	0.80584	0.00459	6	0.75000	0.45900
D (50%) 2.5mg/L	1	0.80986	0.80458	0.00528	10	0.52800	0.52800
	2	0.81466	0.80979	0.00487	10	0.48700	0.48700
	3	0.81281	0.80830	0.00451	9	0.50111	0.45100
	4	0.80937	0.80491	0.00446	7	0.63714	0.44600
E (100%) 5.0mg/L	1	100% mortality			0		
	2	/			0		
	3	/			0		
	4	↓			0		

Larval Fish Growth and Survival Test-96 Hr Survival

Start Date: 9/20/2011 Test ID: 2112magh Sample ID: MAGNISOL
 End Date: 9/27/2011 Lab ID: -GREAT LAKES ENVIRONM Sample Type: PRODUCT
 Sample Date: Protocol: EPAFW02-EPA/821/R-02-01 Test Species: PP-Pimephales promelas
 Comments: Bay Harbor-CMS 2112-00; Septmeber 2011 Magnisol

Conc-mg/L	1	2	3	4
MH Control	0.8000	0.7778	1.0000	0.9000
0.31	1.0000	0.7000	0.7000	0.9000
0.63	0.9000	0.9000	0.8000	0.9000
1.25	1.0000	1.0000	1.0000	1.0000
2.5	1.0000	1.0000	0.9000	0.8000
5	0.1000	0.0000	0.0000	0.0000

Transform: Arcsin Square Root

Conc-mg/L	Mean	N-Mean	Transform: Arcsin Square Root				Number Resp	Total Number	
			Mean	Min	Max	CV%			
MH Control	0.8694	1.0000	1.2120	1.0799	1.4120	12.587	4	5	39
0.31	0.8250	0.9489	1.1608	0.9912	1.4120	17.825	4	7	40
0.63	0.8750	1.0064	1.2136	1.1071	1.2490	5.846	4	5	40
1.25	1.0000	1.1502	1.4098	1.4033	1.4120	0.307	4	0	39
2.5	0.9250	1.0639	1.2951	1.1071	1.4120	11.347	4	3	40
5	0.0250	0.0288	0.1995	0.1588	0.3218	40.840	4	39	40

Auxiliary Tests

Shapiro-Wilk's Test indicates normal distribution ($p > 0.05$)	Statistic	Critical	Skew	Kurt
Bartlett's Test indicates unequal variances ($p = 1.57E-03$)	19.4716	15.0863	0.26895	-0.1701

Trimmed Spearman-Karber

Trim Level	EC50	95% CL
0.0%		
5.0%	3.5707	3.5033 3.6395
10.0%	3.5707	3.5033 3.6395
20.0%	3.5707	3.5033 3.6395
Auto-2.8%	3.5707	3.5033 3.6395

Larval Fish Growth and Survival Test-7 Day Survival

Start Date: 9/20/2011 Test ID: 2112magfh Sample ID: magnisol
 End Date: 9/27/2011 Lab ID: -GREAT LAKES ENVIRONM Sample Type: product
 Sample Date: Protocol: EPAFW02-EPA/821/R-02-01 Test Species: PP-Pimephales promelas
 Comments: Bay Harbor-CMS 2112-00; Septmeber 2011 Magnisol

Conc-mg/L	1	2	3	4
MH Control	0.8000	0.6667	1.0000	0.9000
0.31	1.0000	0.7000	0.6000	0.9000
0.63	0.9000	0.9000	0.8000	0.9000
1.25	1.0000	1.0000	0.9000	0.6000
2.5	1.0000	1.0000	0.9000	0.7000
5	0.0000	0.0000	0.0000	0.0000

Conc-mg/L	Transform: Arcsin Square Root						1-Tailed			
	Mean	N-Mean	Mean	Min	Max	CV%	N	t-Stat	Critical	MSD
MH Control	0.8417	1.0000	1.1809	0.9553	1.4120	16.536	4			
0.31	0.8000	0.9505	1.1346	0.8861	1.4120	21.129	4	0.327	2.360	0.3343
0.63	0.8750	1.0396	1.2136	1.1071	1.2490	5.846	4	-0.231	2.360	0.3343
1.25	0.8750	1.0396	1.2376	0.8861	1.4120	19.879	4	-0.401	2.360	0.3343
2.5	0.9000	1.0693	1.2061	0.9912	1.4120	15.696	4	-0.601	2.360	0.3343
5	0.0000	0.0000	0.1588	0.1588	0.1588	0.000	4			

Auxiliary Tests		Statistic	Critical	Skew	Kurt					
Shapiro-Wilk's Test indicates normal distribution (p > 0.05)		0.95678	0.905	-0.455	-0.6941					
Bartlett's Test indicates equal variances (p = 0.46)		3.63464	13.2767							
Hypothesis Test (1-tail, 0.05)	NOEC	LOEC	ChV	TU	MSDu	MSDp	MSB	MSE	F-Prob	df
Dunnett's Test	2.5	5	3.53553		0.29448	0.34421	0.0104	0.04013	0.89958	4, 15
Treatments vs MH Control										

Larval Fish Growth and Survival Test-7 Day Biomass

Start Date: 9/20/2011 Test ID: 2112magfh Sample ID: MAGNISOL
 End Date: 9/27/2011 Lab ID: -GREAT LAKES ENVIRONM Sample Type: PRODUCT
 Sample Date: Protocol: EPAFW02-EPA/821/R-02-01 Test Species: PP-Pimephales promelas
 Comments: Bay Harbor-CMS 2112-00; Septmeber 2011 Magnisol

Conc-mg/L	1	2	3	4
MH Control	0.4160	0.3833	0.5320	0.4560
0.31	0.5510	0.4470	0.3570	0.4840
0.63	0.4860	0.5370	0.4490	0.4940
1.25	0.5867	0.5490	0.5110	0.3240
2.5	0.5280	0.4870	0.4510	0.4460
5	0.0000	0.0000	0.0000	0.0000

Conc-mg/L	Transform: Untransformed						t-Stat	1-Tailed Critical	Isotonic	
	Mean	N-Mean	Mean	Min	Max	CV%			Mean	N-Mean
MH Control	0.4468	1.0000	0.4468	0.3833	0.5320	14.342	4	-0.249	2.360	0.1226
0.31	0.4597	1.0289	0.4597	0.3570	0.5510	17.597	4	-0.860	2.360	0.1226
0.63	0.4915	1.1000	0.4915	0.4490	0.5370	7.348	4	-0.882	2.360	0.1226
1.25	0.4927	1.1026	0.4927	0.3240	0.5867	23.669	4	-0.600	2.360	0.1226
2.5	0.4780	1.0698	0.4780	0.4460	0.5280	7.952	4			0.4737
5	0.0000	0.0000	0.0000	0.0000	0.0000	0.000	4			0.0000

Auxiliary Tests		Statistic	Critical	Skew	Kurt				
Shapiro-Wilk's Test indicates normal distribution (p > 0.05)		0.95073	0.905	-0.7715	1.08748				
Bartlett's Test indicates equal variances (p = 0.29)		5.02129	13.2767						
Hypothesis Test (1-tail, 0.05)	NOEC	LOEC	ChV	TU	MSDu				
Dunnett's Test	2.5	5	3.53553		0.12263				
Treatments vs MH Control				MSDp	MSB	MSE	F-Prob	df	
					0.27443	0.00161	0.0054	0.87441	4, 15

Linear Interpolation (200 Resamples)					
Point	mg/L	SD	95% CL(Exp)	Skew	
IC05	2.6250	0.5927	0.0000	2.6250	-2.1025
IC10	2.7500	0.2973	0.3136	2.7500	-4.8193
IC15	2.8750	0.1406	2.3894	2.8750	-8.2404
IC20	3.0000	0.0777	2.5430	3.0000	-1.5385
IC25	3.1250	0.0729	2.6965	3.1250	-1.5385
IC40	3.5000	0.0583	3.1572	3.5000	-1.5385
IC50	3.7500	0.0486	3.4643	3.7500	-1.5385

Appendix B

Reference Toxicant Data

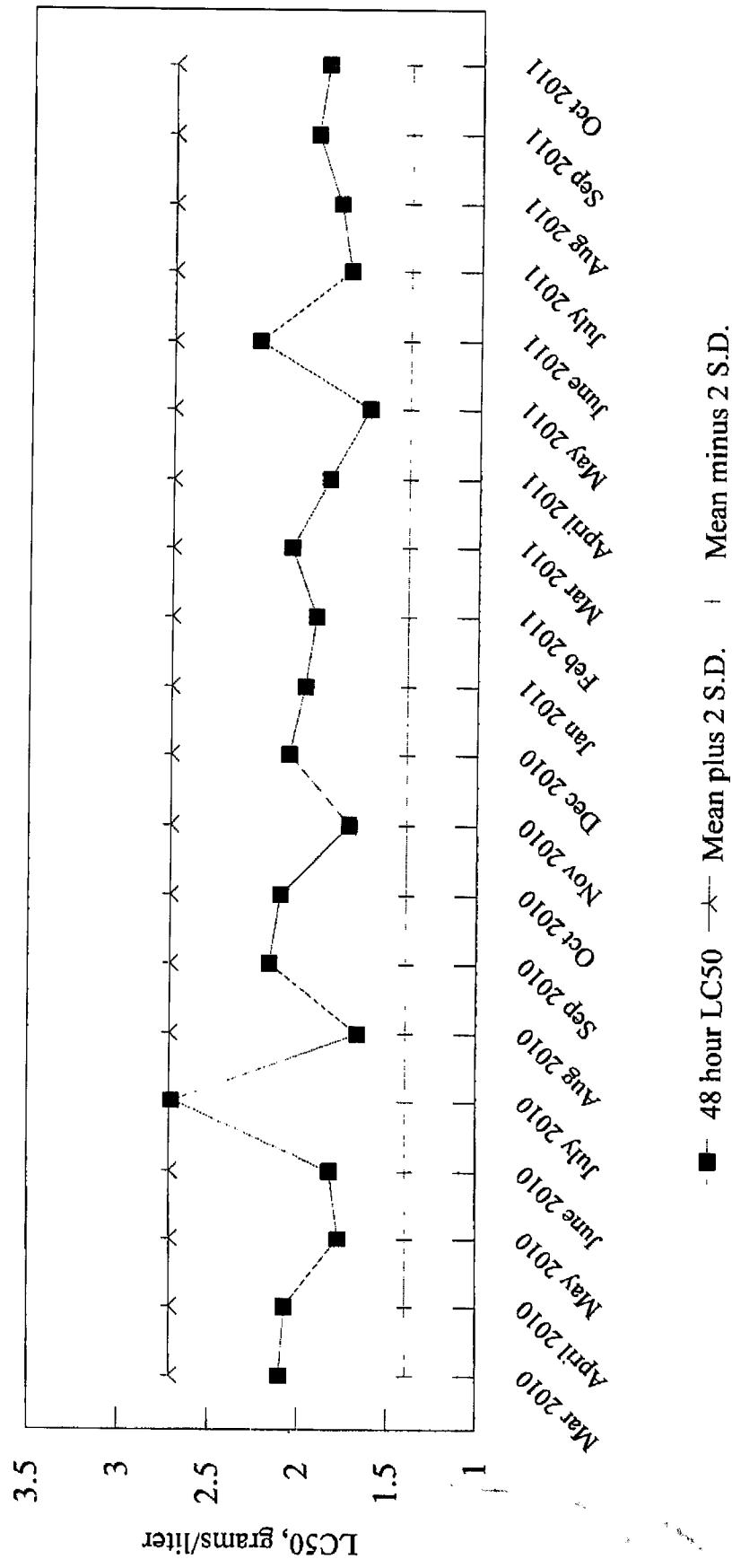


Great Lakes Environmental Center



Ceriodaphnia dubia Survival Sodium Chloride (NaCl) Toxicity Data

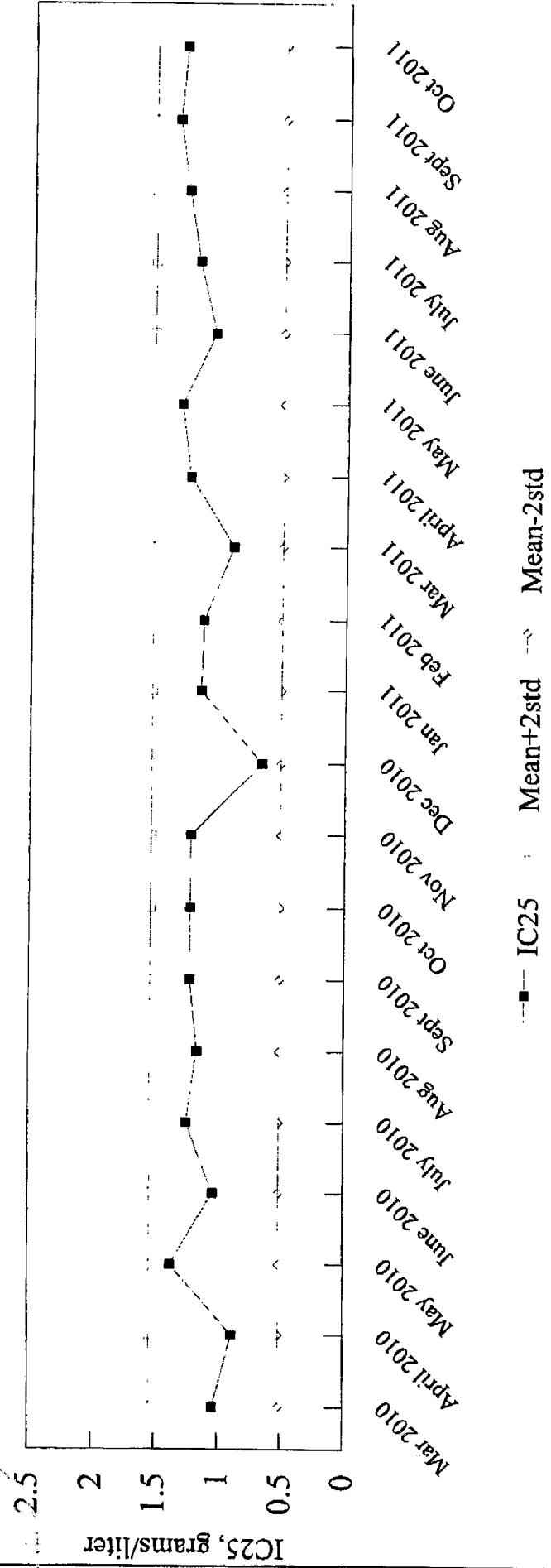
2010-2011





Ceriodaphnia dubia Reproduction NaCl Reference Toxicant Data

2010-2011





Fathead Minnow Survival Sodium Chloride (NaCl) Toxicity Data 2010-2011

LC₅₀, grams/liter

10

9

8

7

6

5

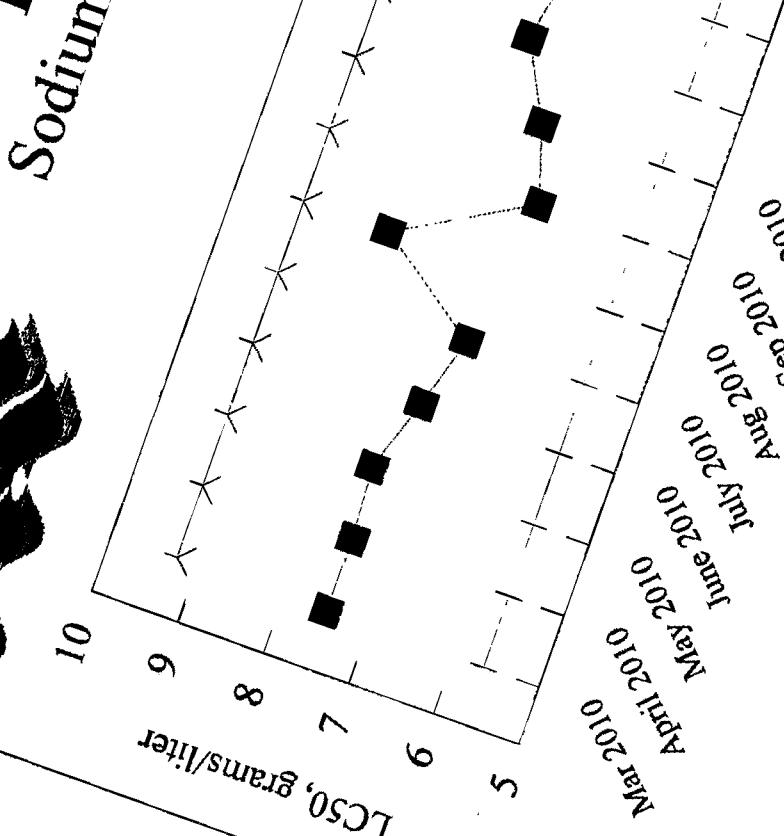
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3

2

1

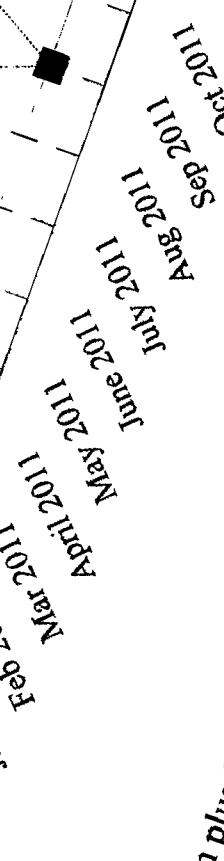
0



48 hour LC₅₀

Mean plus 2 S.D.
/ Mean minus 2 S.D.

/ Mean
/ Mean minus 2 S.D.

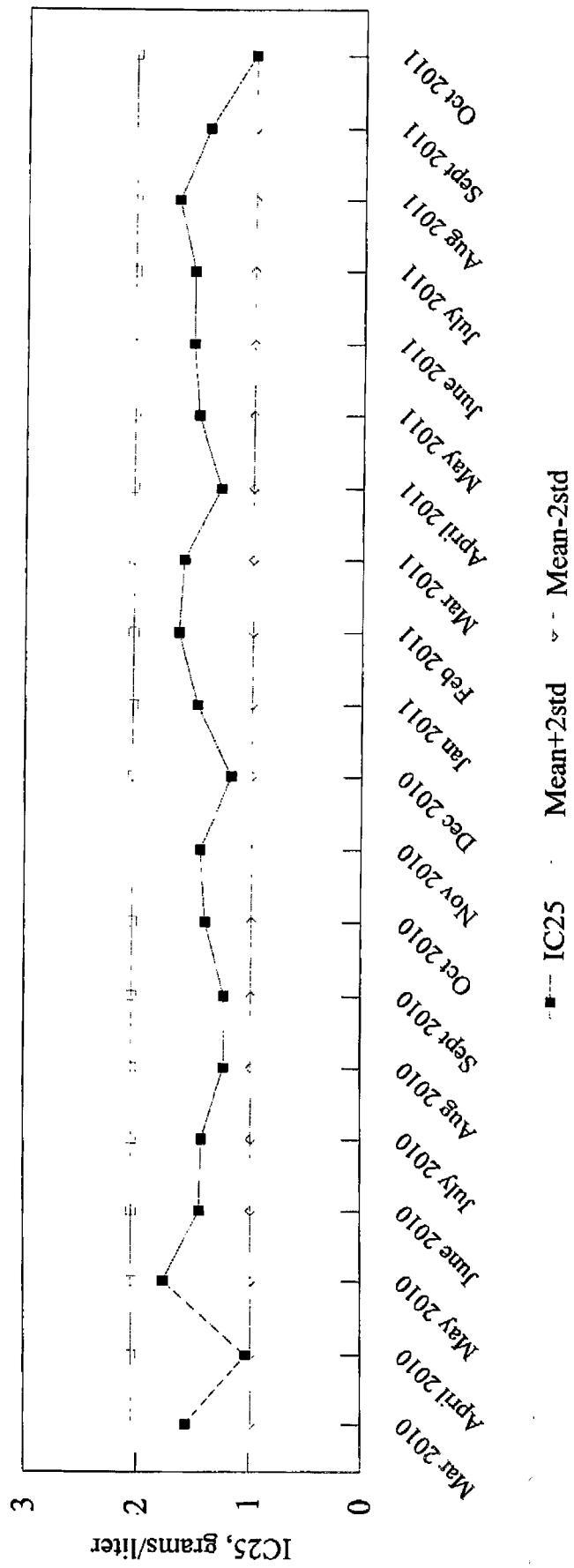




Fathead Minnow Growth

NaCl Reference Toxicant Data

2010-2011



From: (973) 245-6693
 Janet Cerra
 BASF
 100 Campus Drive
 Florham Park, NJ 07932

Origin ID: LKKA



J11201108050225

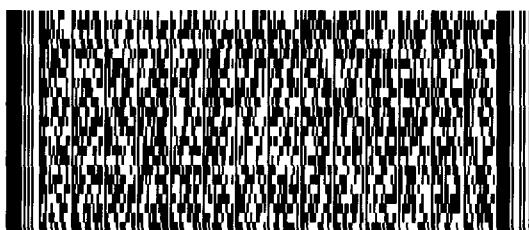
Ship Date: 02DEC11
 ActWgt: 1.0 LB
 CAD: 4487533/INET3210

Delivery Address Bar Code



Ref # US635018
 Invoice #
 PO #
 Dept #

SHIP TO: (202) 564-8930 **BILL SENDER**
Attn: TSCA Section 8(e)
USEPA East
Room 6428
1201 Constitution Avenue, NW
Washington, DC 20004

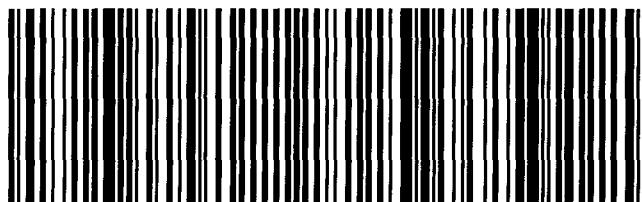


TRK# 7954 6507 6013
 0201

MON - 05 DEC A1
STANDARD OVERNIGHT

20004
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DCA

SA RDVA



50FG1/8C50/F5F4

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